APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/822,090	03/30/2001	Guei-Yuan Lueh	42390P10798	9064

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EXAMINER
STEELMAN, MARY J

ART UNIT	PAPER NUMBER
2122	2

DATE MAILED: 02/26/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

	Application No.		Applicant(s)
Office Action Summary	09/822,090		LUEH, GUEI-YUAN
	Examiner		**Art Unit**
	Mary J. Steelman		2122

-- The MAILING DATE of this communicati n appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE <u>3</u> MONTH(S) FROM
THE MAILING DATE OF THIS COMMUNICATION.
- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed
  after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
  Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any
  earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *30 March 2001*.
2a)☐ This action is **FINAL**.   2b)☒ This action is non-final.
3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is
   closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-39* is/are pending in the application.
   ·4a) Of the above claim(s) _____ is/are withdrawn from consideration.
5)☐ Claim(s) _____ is/are allowed.
6)☒ Claim(s) *1-39* is/are rejected.
7)☐ Claim(s) _____ is/are objected to.
8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☒ The specification is objected to by the Examiner.
10)☒ The drawing(s) filed on *30 March 2001* is/are: a)☐ accepted or b)☒ objected to by the Examiner.
   Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
   Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
   a)☐ All   b)☐ Some * c)☐ None of:
   1.☐ Certified copies of the priority documents have been received.
   2.☐ Certified copies of the priority documents have been received in Application No. _____.
   3.☐ Copies of the certified copies of the priority documents have been received in this National Stage
      application from the International Bureau (PCT Rule 17.2(a)).
   * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)
1)☒ Notice of References Cited (PTO-892)
2)☐ Notice of Draftsperson's Patent Drawing R view (PTO-948)
3)☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
   Paper No(s)/Mail Date _____.

4)☐ Interview Summary (PTO-413)
   Paper No(s)/Mail Date. _____.
5)☐ Notice of Informal Patent Application (PTO-152)
6)☐ Other: _____.

DETAILED ACTION

1.   Claims 1-39 are pending.

Drawings

2.   The drawings are objected to as failing to comply with 37 CFR 1.84(p)(5) because they

include the following reference sign(s) not mentioned in the description:

Fig. 6, item 645. See Specification, page 16, last line.

Fig. 6, item 655. See Specification, page 17, line 4.

A proposed drawing correction, corrected drawings, or amendment to the specification to

add the reference sign(s) in the description, are required in reply to the Office action to avoid

abandonment of the application. The objection to the drawings will not be held in abeyance.

Specification

3.   **Content of Specification**

(a)   <u>Title of the Invention</u>: See 37 CFR 1.72(a) and MPEP § 606. The title of the
        invention should be placed at the top of the first page of the specification unless
        the title is provided in an application data sheet. The title of the invention should
        be brief but technically accurate and descriptive, preferably from two to seven
        words may not contain more than 500 characters.

(b)   <u>Cross-References to Related Applications</u>: See 37 CFR 1.78 and MPEP § 201.11.

(c)   <u>Statement Regarding Federally Sponsored Research and Development</u>: See MPEP
        § 310.

(d)   <u>Incorporation-By-Reference Of Material Submitted On a Compact Disc</u>: The
        specification is required to include an incorporation-by-reference of electronic
        documents that are to become part of the permanent United States Patent and
        Trademark Office records in the file of a patent application. See 37 CFR 1.52(e)
        and MPEP § 608.05. Computer program listings (37 CFR 1.96(c)), "Sequence
        Listings" (37 CFR 1.821(c)), and tables having more than 50 pages of text were
        permitted as electronic documents on compact discs beginning on September 8,
        2000.

Or alternatively, <u>Reference to a "Microfiche Appendix"</u>: See MPEP § 608.05(a). "Microfiche Appendices" were accepted by the Office until March 1, 2001.

(e)   <u>Background of the Invention</u>: See MPEP § 608.01(c). The specification should set forth the Background of the Invention in two parts:

    (1)   <u>Field of the Invention</u>: A statement of the field of art to which the invention pertains. This statement may include a paraphrasing of the applicable U.S. patent classification definitions of the subject matter of the claimed invention. This item may also be titled "Technical Field."

    (2)   <u>Description of the Related Art including information disclosed under 37 CFR 1.97 and 37 CFR 1.98</u>: A description of the related art known to the applicant and including, if applicable, references to specific related art and problems involved in the prior art which are solved by the applicant's invention. This item may also be titled "Background Art."

(f)   <u>Brief Summary of the Invention</u>: See MPEP § 608.01(d). A brief summary or general statement of the invention as set forth in 37 CFR 1.73. The summary is separate and distinct from the abstract and is directed toward the invention rather than the disclosure as a whole. The summary may point out the advantages of the invention or how it solves problems previously existent in the prior art (and preferably indicated in the Background of the Invention). In chemical cases it should point out in general terms the utility of the invention. If possible, the nature and gist of the invention or the inventive concept should be set forth. Objects of the invention should be treated briefly and only to the extent that they contribute to an understanding of the invention.

(g)   <u>Brief Description of the Several Views of the Drawing(s)</u>: See MPEP § 608.01(f). A reference to and brief description of the drawing(s) as set forth in 37 CFR 1.74.

(h)   <u>Detailed Description of the Invention</u>: See MPEP § 608.01(g). A description of the preferred embodiment(s) of the invention as required in 37 CFR 1.71. The description should be as short and specific as is necessary to describe the invention adequately and accurately. Where elements or groups of elements, compounds, and processes, which are conventional and generally widely known in the field of the invention described and their exact nature or type is not necessary for an understanding and use of the invention by a person skilled in the art, they should not be described in detail. However, where particularly complicated subject matter is involved or where the elements, compounds, or processes may not be commonly or widely known in the field, the specification should refer to another patent or readily available publication which adequately describes the subject matter.

      (i)   <u>Claim or Claims</u>: See 37 CFR 1.75 and MPEP § 608.01(m). The claim or claims must commence on separate sheet or electronic page (37 CFR 1.52(b)(3)). Where a claim sets forth a plurality of elements or steps, each element or step of the claim should be separated by a line indentation. There may be plural indentations to further segregate subcombinations or related steps. See 37 CFR 1.75 and MPEP § 608.01(i)-(p).

      (j)   <u>Abstract of the Disclosure</u>: See MPEP § 608.01(f). A brief narrative of the disclosure as a whole in a single paragraph of 150 words or less commencing on a separate sheet following the claims. In an international application which has entered the national stage (37 CFR 1.491(b)), the applicant need not submit an abstract commencing on a separate sheet if an abstract was published with the international application under PCT Article 21. The abstract that appears on the cover page of the pamphlet published by the International Bureau (IB) of the World Intellectual Property Organization (WIPO) is the abstract that will be used by the USPTO. See MPEP § 1893.03(e).

      (k)   <u>Sequence Listing</u>. See 37 CFR 1.821-1.825 and MPEP §§ 2421-2431. The requirement for a sequence listing applies to all sequences disclosed in a given application, whether the sequences are claimed or not. See MPEP § 2421.02.

Examiner objects to the lack of cross references to related applications. Item (b) above.

4.   The use of the trademark JAVA has been noted in this application. It should be capitalized wherever it appears and be accompanied by the generic terminology.

Although the use of trademarks is permissible in patent applications, the proprietary nature of the marks should be respected and every effort made to prevent their use in any manner which might adversely affect their validity as trademarks.

Claim Rejections - 35 USC § 112

5.   The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

6.   7.35.01 Trademark or Trade Name as a Limitation in the Claim

Claims 13-15, 28-30, and 37-39 contain the trademark/trade name JAVA/JVMDI. Where a

trademark or trade name is used in a claim as a limitation to identify or describe a particular

material or product, the claim does not comply with the requirements of 35 U.S.C. 112, second

paragraph.

See Ex parte Simpson, 218 USPQ 1020 (Bd. App. 1982). The claim scope is uncertain

since the trademark or trade name cannot be used properly to identify any particular

material or product. A trademark or trade name is used to identify a source of goods,

and not the goods themselves. Thus, a trademark or trade name does not identify or

describe the goods associated with the trademark or trade name. In the present case,

the trademark/trade name is used to identify/describe byte code instruction set programming

language and, accordingly, the identification/description is indefinite.

7.   Lack of Antecedent basis:

        Claims 4-7 and 15 recite the limitation "executing the field watch" in line 1 of claim 4.

There is insufficient antecedent basis for this limitation in the claim. Making claim 4 dependent

on claim 3 could cure this.

        Claims 19-22 and 30 recite the limitation "executing the field watch" in line 2 of claim

19. There is insufficient antecedent basis for this limitation in the claim. Making claim 19

dependent on claim 18 could cure this.

        Claims 34 and 35 recite the limitation "instruction code causing the processor to execute

a field watch" in lines 1-2 of claim 34. There is insufficient antecedent basis for this limitation in

the claim. Making claim 34 dependent on claim 33 could cure this.

Claim 9 recites the limitation "the stub" in line 3. There is insufficient antecedent basis for this limitation in the claim.

Claim 10 recites the limitation "the stub" in line 3. There is insufficient antecedent basis for this limitation in the claim. Changing "the stub" to "a stub" or making claim 10 dependent on claim 8 could cure this.

Claim 35 recites the limitation "the stub" in line 3. There is insufficient antecedent basis for this limitation in the claim. Changing "the stub" to "a stub" could cure this.

Claims 24 and 26 recite the limitation "code to guard execution of the instrumentation code" in claim 24, line 2. There is insufficient antecedent basis for this limitation in the claim. Changing claim 24 to be dependent on claim 17 would cure this.

Claim 35 recites the limitation "to guard execution of the instrumentation code" in line 2. There is insufficient antecedent basis for this limitation in the claim. That feature is introduced in claim 32.

Claim Rejections - 35 USC § 103

8.   The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

9.   Claims 1, 4-8, 13-16, 19-23, 28-31, 34, and 37-39 are rejected under 35 U.S.C. 103(a) as being unpatentable over US Patent 6078744 to Wolczko et al., in view of US Pre Grant Publication 2001/0047510 A1 To Angel et al.

Per claims 1, 16 and 31:

Wolczko disclosed re-compiling bytecode into native code (col. 6, 51-54, "...recompiles portions of the source program and generates optimized machine code..." using a JIT compiler (col. 6, line 36), when changing portions of a program during optimization. Abstract, lines 1-3, "Apparatus (a system as noted in claim 31), methods (as noted in claim 1), and computer program products (as noted in claim 16) are disclosed for improving the performance of subsequent compilations of a source program.

Wolczko failed to disclose:

-when a field watch for a field is activated, the function including a byte code sequence having a field byte code that accesses or modifies the field;

-generating an instrumentation code corresponding to the field watch of the field;

-inserting the instrumentation code to the native code.

However, Angel, US Pre Grant Publication 2001/0047510 A1 disclosed [0184], "the monitoring DLL in connection with providing data to the analyzer/viewers...may be implemented as native code that is called via the monitoring function calls that are inserted into the instrumented class..." and [0015], "...method parameter may be passed...from an instrumentation runtime function...", [0052], "Code instrumentation software...accesses the transitional representations and adds instrumentation instructions (inserting instrumentation code)...", [0091], "it is useful to instrument memory access instructions (fields)...monitoring (field watch activated) the variables (fields) of a program that access (accesses or modifies field) memory...", [0111], "...instructions being instrumented relate to memory variable (byte code

that accesses field) accesses...", [0125], "...automatically editing the executable byte code

representation of...methods for <u>generating instrumented byte code</u>." (emphasis added), [0127],

"One objective of the instrumentation process is to alter the program to facilitate the gathering of

diagnostic (field watch activated)...information on the program when it is executed..." Angel

provided references that determine if a field is to be 'watched', then instrumentation code is

generated and inserted.

Therefore, it would have been obvious, to one of ordinary skill in the art, at the time of

the invention to have modified Wolczko's invention that recompiles altered code dynamically,

when optimizing and changing a small portion of the program (col. 1, lines 41-42), by including

the features disclosed by Angel, altering code with instrumentation, recompiling as necessary,

and otherwise using previously compiled portions, thereby reducing a startup delay.

Per claims 4, 19, and 34:

Wolczko disclosed recompiling portions of program code when making changes during

optimization. Angel provided more details regarding the alteration of the code prior to

recompiling. Wolczko failed to provide information related to saving state, executing and event

hook then restoring state.

However, Angel disclosed:

-saving live global state, the live global state corresponding to an active register; ([0169],

"...routine is then patched...at runtime, each call..is intercepted...", [0170], "The patch uses an

assembly code thunk that includes a small amount of assembly code and a class instance (data

structure) that lets the patch code get control (this is done by saving state) before the native code

routine starts...", [0174], "The assembly thunk code may put a pointer...into whichever register

(corresponding active register)...")

-executing an event hook function for an event corresponding to the field watch; ([0170], "patch

code get control before the native code routine starts, and also gets control back when the native

code routine exits." (code is executed), also [0137], "The instrumentation program operates in

cooperation with the VM runtime system and may take advantage of particular hooks...")

-restoring the live global state. ([0170], "and also gets control back (restore state from registers)

when the native code routine exits.")

Therefore, it would have been obvious, to one of ordinary skill in the art, at the time of

the invention, to have modified Wolczko's invention that recompiles altered code dynamically,

when optimizing and changing a small portion of the program (col. 1, lines 41-42), by including

features as disclosed by Angel: saving state, executing a function, and restoring state, as this is

well known in the art.

Per claims 5 and 20, Angel disclosed:

-pushing the live global state onto a stack. ([0153], "parameters that are passed during

instrumentation are passed in a conventional fashion using the stack. Thus, the parameters are

pushed on to the stack prior to invocation of the monitoring function being called.")

Per claims 6 and 21, Angel disclosed:

-passing an argument corresponding to the field; ([0093], "pass a variable pointer (passing an

argument) to a function and have that pointer be assigned to another variable within the

function...", [0114], "The run time instrumentation node may be a function call to a run time

instrumentation function that uses the child node as one of the arguments and returns the value of

the child node from the function call to make the value available for the operation node.")

-calling a run-time library function related to the event. ([0113], "each of the specific run time

instrumentation routines that is provided may include a function that is called to perform the

instrumentation operation...", [0119], "The run time instrumentation code may be implemented

by using a separate set of routines that is linkable to the code being instrumented via the function

calls...The initialization routine determines if an executable library corresponding to the run time

instrumentation routine is available...")

Per claims 7 and 22:

-retrieving the live global state from the stack. (See arguments presented in the rejection of

claim 4.)

Per claims 8 and 23, Angel disclosed:

-inserting the instrumentation code in a stub at end of the code space. ([0149], "...exit point is

instrumented.", [0157], "instrumentation code is inserted at the end of the method...")

Per claims 13, 28, and 37, Angel disclosed:

-the function is a JAVA method. ([0014], "instrumenting a byte code (JAVA) computer

program...", [0144], "entry of method is instrumented.")

Per claims 14, 29, and 38, Angel disclosed:

-the field is a JAVA field in a JAVA virtual machine. ([0014], "instrumenting a byte code

(JAVA) computer program...", [0147], "byte code is inserted into the method to cause a local

line number variable (field) to be set to the new line number when the method runs.")

Per claims 15, 30 and 39, Angel disclosed:

-the event hook function is compatible with a JAVA Virtual Machine Debug Interface (JVMDI).

([0137], "Instrumentation program operates in cooperation with the VM runtime system and may

take advantage of particular hooks (a virtual machine debug interface) or calls provided by the

vendors of the VM runtime system." A JAVA Virtual Machine Debug Interface, JVMDI, is a

debug interface, that is trademarked by Sun Microsystems.)

10.   Claims 2, 3, 9-12, 17, 18, 24-27, 32, 33, 35 and 36 are rejected under 35 U.S.C. 103(a) as

being unpatentable over US Patent 6078744 to Wolczko et al., in view of US Pre Grant

Publication 2001/0047510 A1 To Angel et al., and further in view of "Poor Man's Watchpoints",

by Max Copperman and Jeff Thomas (1995).

Per claims 2, 3, 17, 18, 32 and 33:

        Wolczko disclosed recompiling portions of program code when making changes during

optimization. Angel provided more details regarding the alteration of the code prior to

recompiling. Neither Wolczko nor Angel disclosed enabling / disabling the execution of

instrumented code.

However, Copperman and Thomas disclosed:

-guarding execution of the instrumentation code if the field watch is not activated; executing a

filed watch sequence if the field watch is activated. (Page 38, The Debuggee, 3rd paragraph,

"When no watchpoints are set..." (disabled/guarded), page 40, maintaining the Watch Table, 2nd

paragraph, "When a watchpoint command is entered or enabled (activated)...When a command

is disabled or canceled (guarded / not activated) ...")

Therefore, it would have been obvious, to one of ordinary skill in the art, at the time of

the invention, to have modified Wolczko and Angel, by using Copperman and Thomas's

disclosure that allows a user to control the enabling / disabling of watchpoints when inserting

code modification, thereby making optimization more useful.

Per claims 9, 24, and 35, Angel disclosed:

-updating an offset of a jump instruction to the stub when the field watch is activated. ([0176],

"The records contain the new offset of the byte code instructions, which are moved due to

insertion of instrumentation instructions.", [0181], "...the code table...to reflect the new offsets

of the instrumented byte code...", [0182], (...byte code is modified to update branch instructions

to reflect the new offsets...")

Therefore, it would have been obvious, to one of ordinary skill in the art, at the time of

the invention, to have modified Wolczko's invention that recompiles portions of byte code into

native code when altering small portions of code during optimization, by including details

provided by Angel regarding the necessary change in offsets due to the addition of

instrumentation code.

Per claims 10, 25, and 36:

Wolczko disclosed recompiling portions of program code when making changes during

optimization. Angel provided more details regarding the alteration of the code prior to

recompiling. Neither Wolczko nor Angel disclosed enabling code with a jump instruction.

However, Copperman and Thomas disclosed:

-replacing a no-op sequence with a jump instruction to the stub. (Page 37, Introduction, 4th

paragraph, "code patching - replacing each store and/or load instructions with an inline check or

call to a function that gives control to the debugger if the accessed location is being watched, and

subsequently executes..." Also, page 40, The Debugger, 3rd paragraph, "On receiving a

watchpoint command, the debugger has to add an entry to the watch table and ensure that <cmd>

is executed (jump to stub / instrumentation code) when the watchpoint is hit. Also, page 40, last

paragraph, "user's command must be executed at the patch target (stub / instrumented code).")

Therefore, it would have been obvious, to one of ordinary skill in the art, at the time of

the invention, to have modified Wolczko's and Angel's invention by including information as

provided by Copperman and Thomas regarding jumping to an inserted patch / instrumented code

portion / stub for the purpose of optimizing through instrumentation, when altering control flow

of a program as these are well known techniques.

Per claims 11, 12, 26 and 27:

Wolczko disclosed recompiling portions of program code when making changes during

optimization. Angel provided more details regarding the alteration of the code prior to

recompiling. Neither Wolczko nor Angel disclosed clearing code that would otherwise execute

an instrumented portion.

However, Copperman and Thomas disclosed:

-clearing the field watch by replacing the offset with a zero offset. (Page 38, The Dubuggee, 3rd

paragraph, "When no watchpoints are set...made the first instruction in the patch branch around

the rest of the patch if $fp contains zero...")

-clearing the field watch by replacing the jump instruction with the no-op sequence. (Page 40,

Maintaining The Watch Table, 2nd paragraph, "When a command is disabled or canceled, the last

range in the table is copied over the range that is no longer being watched...If the table is empty,

$fp is set to zero..., page 41, 3rd paragraph, "...code to...disable, enable and cancel individual

watchpoints...")

Therefore, it would have been obvious, to one of ordinary skill in the art, at the time of

the invention, to have modified Wolczko and Angel, by using Copperman and Thomas's

disclosure that provides more information regarding clearing the watch field when instrumenting

code because these features allow interactive user control, thereby making optimization through

instrumentation more flexible.

Conclusion

11.   The prior art made of record and not relied upon is considered pertinent to applicant's

disclosure.

12.   Any inquiry concerning this communication or earlier communications from the

examiner should be directed to Mary Steelman, whose telephone number is (703) 305-4564. The

examiner can normally be reached Monday through Thursday, from 7:00 A.M. to 5:30 P.M.   If

attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Tuan

Dam can be reached on (703) 305-4552.

The fax phone number is (703) 872-9306 for regular communications and for After Final

communications. Any inquiry of a general nature or relating to the status of this application or

proceeding should be directed to the receptionist whose telephone number is (703) 305-3900.

Mary Steelman

02/19/2004

TUAN DAM
SUPERVISORY PATENT EXAMINER